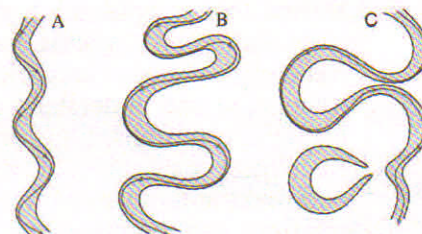


1. **DESCRIPTION:** Students will use process skills to complete tasks related to Earth's fresh waters.

A TEAM OF UP TO: 2

APPROXIMATE TIME: 50 minutes

2. **EVENT PARAMETERS:** Each team may bring **four** 8.5" x 11" double-sided page of notes containing information in any form from any source and bring up to two non-graphing calculators.
3. **THE COMPETITION:** Participants will be presented with one or more tasks, many requiring the use of process skills (i.e., observing, classifying, measuring, inferring, predicting, communicating, and using number relationships) from the following topics:
 - a. Interpretation of fresh water features shown on USGS topographic maps
 - b. Stream drainage systems: drainage patterns, main channel, tributaries, V-shaped valleys, watersheds
 - c. Channel types: braided, meandering, straight
 - d. Sediment: weathering, erosion, forms and sizes, transportation, deposition
 - e. River valley forms and processes: geology, gradient, base level, floodplain features, dynamic equilibrium, nick points, waterfalls, stream capture, deltas and fans
 - f. Perennial and intermittent stream flow, stream gauging and monitoring, stream flow calculations, discharge, load, floods, recurrence intervals, Chezy and Manning equations (Division C only)
 - g. Groundwater: zone of aeration, zone of saturation, water table, porosity, permeability, aquifers, confining beds, hydraulic gradient, water table contour lines, flow lines, capillarity, recharge and discharge
 - h. Karst features: sinkholes, solution valleys, springs, disappearing streams, caves
 - i. Lake formation and types: faulting, rifting, volcanic action, glaciation, damming of rivers, changes over time
 - j. Lake features: inflow and outflow, physical and chemical properties, stratification, shorelines, waves
 - k. Wetlands: bogs and marshes, interactions between surface and groundwater
 - l. Destruction/Effects of land use changes, dams and levees: sedimentation, down-cutting, diversion of water, flooding, ecological changes
 - m. Hydrologic cycle and water budgets: precipitation, runoff, evaporation
 - n. Pollution: types, sources, transport



4. **REPRESENTATIVE TASKS:**
 - a. Analyze and interpret features and actions of a stream or river appearing on a topographic map including watershed boundaries, elevation, gradient, direction of flow, drainage pattern, valley shapes, erosional landscapes, and depositional features
 - b. Construct a water table contour map and indicate the direction of groundwater movement
 - c. Analyze data on the thermal structure of a lake and determine how the stratification changes seasonally
5. **SCORING:** Points will be awarded for the quality and accuracy of responses. Ties will be broken by the accuracy and/or quality of answers to pre-selected questions.

Recommended Resources: All reference and training resources including the **Bio/Earth CD** are available on the Official Science Olympiad Store or Website at <http://www.soinc.org>.